COMBAT AIRCRAFT PLANS IN THE DEPARTMENT OF THE NAVY: KEY ISSUES

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PREFACE

As the Congress considers the 1986 defense budget, the Navy program for increasing and modernizing its combat air forces will be an important issue. Over the next five years, the Navy plans to spend $71 billion on aircraft; average annual real growth in the aircraft account would exceed 6 percent. Yet, as this analysis shows, at the end the Navy would still have substantial shortfalls and excesses of aircraft even assuming its own plans for procurements and retirements. This suggests that the Congress and the Administration may have to consider alternative approaches to meeting Navy aircraft needs. This preliminary analysis identifies some alternatives; the final version of the study will consider alternatives in detail. This analysis was requested by the House Budget Committee as part of a larger analysis of the costs of maintaining a 600-ship Navy. In keeping with CBO's mandate to provide objective and impartial analysis, the study contains no recommendations.

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SUMMARY

The Navy plans to increase the number of its deployable aircraft carriers from 13 today (up from 12 in 1981) to 15 by the early 1990s. The added carriers, the Navy argues, will provide the United States with additional ability to maintain a worldwide naval presence in peacetime and additional naval capability in the event of war. To provide aircraft for these carriers, the Navy added a thirteenth air wing last year and plans a fourteenth wing in 1987; the fifteenth wing will come from reserve forces. (An air wing consists of 80 to 90 planes that fly from an aircraft carrier, plus associated support aircraft.) These new wings, plus existing ones, will be modernized according to a new plan recently adopted by the Navy that modifies the composition of most air wings.

Expansion and modernization will add substantially to costs. The Congress appropriated $11.5 billion for the Navy aircraft procurement account in 1985. Proposed funds for 1986 amount to $12.1 billion and total $71 billion over the next five years. (All costs in this study are expressed in 1986 constant dollars of budget authority.) The average real growth of the program from 1985 to 1990 is approximately 6 percent.

Even with this funding, however, the Navy will not meet its stated requirements. (Aircraft requirements in this analysis are based on Navy plans for the size and composition of its combat forces and those of the Marine Corps, together with Navy planning factors for support and training aircraft.) By 1992--when all aircraft bought over the next five years are in the fleet—the Navy will be short some 366 aircraft of nine different types and will have bought 239 more planes than it needs of five other types. The largest shortfall will be of A-6 medium attack aircraft; most in excess will be F/A-18 dual-purpose aircraft.

Nor is this just a problem of the 1990s. In 1988, the Navy will be short a total of 314 aircraft, including 58 A-6 aircraft. Beginning to meet these needs in 1988 would require substantial changes in the Navy plan for 1986, since it takes about two years to procure new aircraft and get them into the fleet.

In part, these mismatches between Navy plans and requirements reflect the Navy's intention to shift to a new composition of its aircraft carrier wings. This intention, which has been officially approved but has apparently not been reflected in Navy procurement plans, calls for more A-6 aircraft on most aircraft carriers to provide increased offensive capability, but fewer F/A-18 aircraft. Mismatches in Navy plans are exacerbated by the increase in the number of carrier wings as the Navy increases to 15 deployable carriers. And solutions are more difficult because the Navy aircraft fleet is old.

Unless otherwise noted, all years referred to in this paper are fiscal years.

Details in the text, tables, and figures of this report may not add to the totals because of rounding.

All costs are expressed in 1986 dollars using the Administration's February 1985 economic assumptions.

Meeting Navy aircraft shortfalls would require the Navy to invest another $10.0 billion over the next five years in addition to the $71 billion it already plans to invest. The Navy could hold down increases by revising its procurement plans to slow or terminate programs and avoid excess aircraft, but even then it would have to add $2.8 billion. If the Administration and the Congress wish to meet Navy aircraft needs without adding to planned spending, or while reducing spending below planned levels in order to meet deficit reduction targets, they will have to consider alternative approaches. These could include returning to the old composition of Navy air wings, seeking to make Navy aircraft procurement more efficient, or revising plans that call for maintaining 15 deployable aircraft carriers.

INTRODUCTION

Navy and Marine Corps aircraft--along with aircraft in the Army and Air Force that are not discussed in this paper--play an important role in deterring conflicts and, if necessary, in fighting a war. 1/ Today the fleet of Navy and Marine Corps aircraft numbers over 3,700. In the event of war, these aircraft would carry out a variety of missions:

- Fighter/interceptor aircraft would intercept and attack enemy aircraft, both to protect high-value ships such as aircraft carriers and to secure military control of the air;

- Attack aircraft would bomb surface targets. The Navy's attack aircraft include light attack aircraft (with relatively small payloads and ranges) and medium attack aircraft (with longer payloads and ranges); 2/

- Antisubmarine warfare aircraft would detect and attack enemy submarines;

- Electronic warfare/early warning aircraft would have the dual mission of alerting U.S. forces to the presence of enemy aircraft and jamming enemy transmissions and listening devices;

- Marine assault aircraft would transport troops and equipment from ships to shore.

The Navy and Marine Corps have in their inventory, or are planning to procure, 20 kinds of aircraft to perform these various missions. Of these, five are key to this study's analysis:

- F-14 fighter/interceptor aircraft operate off aircraft carriers and are the most capable of protecting the carrier against destruction by enemy aircraft, particularly long-range bombers;

- A-6 medium attack aircraft operate off aircraft carriers and are the most capable Navy attack aircraft, having long-range, large-payload, all-weather, and day/night capabilities;

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1. For more information on the Air Force's combat aircraft, see Congressional Budget Office, Tactical Combat Forces of the United States Air Force: Issues and Alternatives (Staff Working Paper), May 1984.

2. Heavy attack aircraft, which have large payloads and long ranges, are operated by the Air Force rather than by the Navy or Marine Corps.

- F/A-18 aircraft operate off aircraft carriers and are designed to provide both fighter and attack capability, though they are generally less capable than the F-14 and A-6 in the fighter/interceptor and attack roles, respectively;

- AV-8B aircraft are designed to provide light attack capability for the Marine Corps, to operate from land bases with short runways, and to take off and land on amphibious ships;

- SH-60F helicopters operate from aircraft carriers and are designed to hunt and destroy submarines that come close to the aircraft carriers.

Most of the aircraft discussed in this study operate off aircraft carriers. All Marine Corps aircraft, however, and some Navy aircraft--principally those that provide capability to detect enemy submarines at long ranges from an air base--operate primarily from land bases. Appendix A presents the roster of Navy and Marine Corps combat aircraft in more detail.

Key Issues

Concern has arisen about Navy and Marine Corps plans for meeting their aircraft requirements. (For brevity, the remainder of this study refers to plans for aircraft belonging to the Navy and Marine Corps as Navy plans.) Over the next five years, the Navy plans to buy 1,413 aircraft. Yet, as this study will show, when those aircraft enter the fleet the Navy will not have met its stated requirements; it will have bought too many of some aircraft and too few of others. Some have suggested that the Navy operates too many aircraft production lines, many at low output rates, and therefore may not be getting as many aircraft for its dollars as it could. Finally, the Navy plans to invest $71 billion in budget authority to buy aircraft over the next five years. It would need even more money to meet all its stated needs. Under pressure to meet deficit reduction targets, the Congress may not provide the planned $71 billion, let alone additional money to meet all shortfalls. This suggests that important revisions may be required in Navy aircraft procurement plans.

Plan of the Study

The study first outlines the Navy's current plans for buying aircraft and the associated costs. Next it compares these plans to Navy requirements, identifying important shortfalls and excesses and their causes. The

last section discusses the costs of filling the shortfalls and presents alternative approaches to meeting Navy aircraft needs.

This is a preliminary report. A later version will analyze alternative approaches to meeting Navy aircraft needs in more detail. Here the focus is on identifying mismatches in Navy aircraft plans, taking as given the Navy's stated requirements and its stated plans for procurement and retirement of aircraft.

NAVY PLANS AND THEIR COSTS

Over the next five years, the Navy plans to buy 1,413 aircraft for the Navy and Marine Corps (see Table B-1 in Appendix B for details). Buys will include 13 different types of airplanes. Planned annual buys increase from 241 in 1986 to 341 in 1990; the larger increases occur mostly in the years beyond 1987. In 1990, it would be buying about 50 percent more aircraft than in 1985, with the largest quantity increase coming in F/A-18 procurement.

These increasing purchases will require substantial increases in the Navy's aircraft budget. The Navy aircraft account pays for the purchase of all the aircraft discussed in this study plus some support and training aircraft not discussed here; it also pays for major modifications to existing aircraft. The Navy has requested $12.1 billion in 1986 and a total of $71 billion during the next five years for this account, an average annual real growth of over 6 percent (see Table 1). This represents substantial but not unprecedented real growth. During the past five years, the Navy has enjoyed real growth in the aircraft account of about 10 percent annually, while the entire Navy budget has grown at a real annual rate of about 6 percent during the same period.

SHORTFALLS AND EXCESSES UNDER ADMINISTRATION PLANS

Despite this substantial growth in aircraft buys and costs, CBO's analysis suggests that the Navy will be short of the requirements associated with Navy and Marine Corps plans for combat forces by 366 aircraft in

TABLE 1. PLANNED NAVY AIRCRAFT PROCUREMENT (In billions of 1986 dollars of budget authority)

	1986	1987	1988	1989	1990	Total 1986-1990
Combat Aircraft Only	7.0	7.3	8.3	9.5	9.0	41.1
Total Navy Aircraft Procurement	12.1	12.8	14.3	16.2	15.6	71.0

1992, when all the aircraft purchased through 1990 are delivered to the fleet (see Table 2). There will be shortfalls in 9 of the 19 types of aircraft that the Navy buys and operates. On the other hand, the Navy will buy 239 more of five types of aircraft than its requirements demand.

The A-6 medium attack aircraft will have the largest shortfall. By 1992, the Navy will be short 124 of these aircraft, about one-third of the total shortfall. Other aircraft with substantial shortfalls will include the SH-60F helicopter and the fixed-wing S-3, components of the carrier air wing, and the SH-2 helicopter, deployed on several kinds of surface combatants; all of these are antisubmarine warfare aircraft.

The F/A-18 shows the largest excess. By 1992 the Navy will have 139 more F/A-18s than it needs according to its requirements, about half the total excess of 239 aircraft.

Nor are these shortages and excesses just a problem of the 1990s. Under current Navy plans, there will be a shortage of 314 aircraft in 1988, including a shortfall of 58 A-6 aircraft. In order to begin to solve problems in 1988, changes would have to be made in the Navy procurement plans for 1986 since it takes about two years to produce an aircraft and get it into the fleet.

These shortages and excesses stem in large part from recent changes in Navy requirements and from the increasing age of the Navy aircraft fleet.

Changing Requirements

The mismatch between Navy plans and requirements is due in part to a shift in the Navy's planned composition for most of its air wings. A Navy air "wing" usually consists of 80 to 90 aircraft of several different types, one wing for each aircraft carrier (see Table B-2 for details). 3/ In last year's hearing testimony, the Navy introduced a new air wing, the result of a long-term Navy study. As Table 3 shows, the new notional wing for most carriers has more medium attack aircraft (A-6s) and fewer dedicated fighter/inter-

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3. Navy aircraft procurement also supports: three active and one reserve Marine Corps air wings which contain about 370 aircraft each; 24 active and 13 reserve squadrons of land-based antisubmarine warfare (ASW) aircraft; and the force requirements associated with two kinds of ASW helicopters based on surface combatants.

TABLE 2. PROJECTED SHORTFALLS/OVERAGES IN COMBAT AIRCRAFT IN 1992

Aircraft	1985 Inventory	1986-1992 Projected Losses a/	1986-1992 Projected Gains b/	1992 Inventory	1992 Requirements	Surplus (+) Deficit (-)
			Short of Requirements			
A-6/KA-6	413	51	58	420	544	-124
AH-1	94	27	44	111	135	-24
CH-46/V-22 c/	281	17	60	324	336	-12
E-2	90	19	37	108	124	-16
EA-6	89	35	62	116	143	-27
P-3	433	47	54	440	441	-1
SH-3/SH-60F d/	137	104	91	124	188	-64
SH-2	92	68	27	51	108	-57
S-3	165	14	0	151	192	-41
Total						-366
			In Excess of Requirements			
F/A-18	249	125	742	866	727	+139
F-14	426	83	126	469	443	+26
AV-8B	35	52	295	278	236	+42
SH-60B	37	17	135	155	145	+10
CH-53	220	31	77	266	244	+22
Total						+239

SOURCE: Congressional Budget Office estimates based on Navy data.

a. Losses include retirement based on the Navy's planned service lives and attrition based on the Navy's attrition factors.
b. Gains are deliveries which may lag procurement by as much as two years--hence gains during this time period include earlier years procurement.
c. The V-22, the Marine Corps' medium assault helicopter, was previously called the JVX.
d. The SH-60F, which will form part of the Navy carrier air wing, was previously called the CV Helicopter.

TABLE 3. NUMBERS OF AIRCRAFT UNDER ALTERNATIVE WING COMPOSITIONS

	New	Old
Fighter/Interceptors		
F-4 and F-14	20	24
Attack aircraft		
A-6 medium attack a/	20	14
A-7 light attack	0	24
Dual purpose (attack or fighter)		
F/A-18	18	0
Antisubmarine warfare		
S-3	10	10
SH-3/SH-60 helos	8	6
Other		
EA-6	5	4
E-2	5	4
Total	86	86

a. Some of the A-6s would be KA-6s, a tanker version that accomplishes aerial refueling.

ceptors (F-4 and F-14 aircraft) than the old notional wing. 4/ The Navy argues that more medium attack aircraft will give the carriers greater of-

4. A notional wing is one used for procurement planning; actual wartime composition of a wing could vary depending on anticipated enemy threat and planned missions. The new notional wing applies to all aircraft carriers except four. The Midway and the Coral Sea (which will retire when the Lincoln enters the fleet) are older carriers which cannot accommodate some advanced aircraft. The Kennedy and the Ranger will have a different kind of air wing that contains no F/A-18s. Table B-3 in Appendix B shows the wings for these carriers.

fensive punch at substantial ranges. The Navy accepts the decrease in dedicated fighter/interceptor aircraft because the new wing has the dual-purpose F/A-18 aircraft, which—with a change in ordnance—can function either as a fighter or an attack aircraft. The shift in wing composition, though approved by the Navy, has apparently not yet been reflected in Navy procurement plans.

The Navy could eliminate part of the mismatch by returning to the old notional wing. This, however, would go against the results of the Navy's own Carrier Air Wing Study, which argued for more attack aircraft. The Navy presented the results of this study to the Congress in hearings last year. The study argued that the notional wings need more A-6 aircraft because they provide a long-range bombing capability that allows the carrier to stay out of the range of many enemy aircraft while retaining the capacity to attack enemy land targets. Abandoning the new air wing would also fail to exploit the flexibility of the F/A-18, a dual-purpose aircraft designed to function in either the fighter or the attack role. Finally, abandoning the new wing could even bring into question the value of adding more aircraft carriers, which are more valuable if they have the increased offensive capability the Navy argues will be embodied in the new air wing.

Others argue in favor of keeping large numbers of F/A-18 aircraft, rather than adding more A-6 aircraft as the new wing does, because the F/A-18 is more maneuverable and more likely to outmaneuver enemy surface-to-air missiles or aircraft; this greater survivability, they argue, outweighs its shorter range. The F/A-18 is just beginning to be deployed in the Navy's forces, and has yet to see combat, so that these issues have not been totally resolved within the Navy. Nonetheless, the Navy has officially adopted the new notional wing, and it is the standard used in this study.

Even a return to the old air wing would not solve all the Navy's aircraft problems. Under the old notional air wing, the Navy would still have a shortfall in 1990 of about 240 of nine kinds of aircraft (43 F-14s, for example) and would still be procuring too many of five aircraft types (a total of about 120 aircraft). These problems stem in part from the increasing numbers of air wings. In fiscal year 1983, the Congress approved procurement of two new large aircraft carriers. These, along with the carriers already being built, will increase the number from 13 deployable carriers in the fleet today (already up from 12 in 1981) to 15 by the early 1990s. 5/ In

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5. Deployable carriers are those that can be available for war in a few weeks. One additional carrier will be in extended overhaul and not available for wartime duty for many months at least through the year 2000.

order to provide air wings for the increased numbers of carriers, the Navy added another (its thirteenth) last year and will add a fourteenth in 1987. The fifteenth wing will be in the reserve forces, which will receive modern aircraft before the fifteenth aircraft carrier creates a need for another wing. (Table B-4 in Appendix B details the timing for new carriers and wings.)

How soon the mismatches occur, and their severity, depends on how rapidly the Navy passes from the old to the new notional air wing. Current plans are to phase in the new notional air wing gradually, starting in 1987 and finishing in the early 1990s (see Table B-5 in Appendix B).

Aircraft requirements are also determined by other technical factors, such as the number of crashes expected during peacetime training and the number of aircraft required in the "pipeline"—that is, the number that must be in repair and training to support aircraft that are actually deployed. CBO used Navy planning factors in estimating these requirements. Figure B-1 in Appendix B shows details of the requirements by category of aircraft.

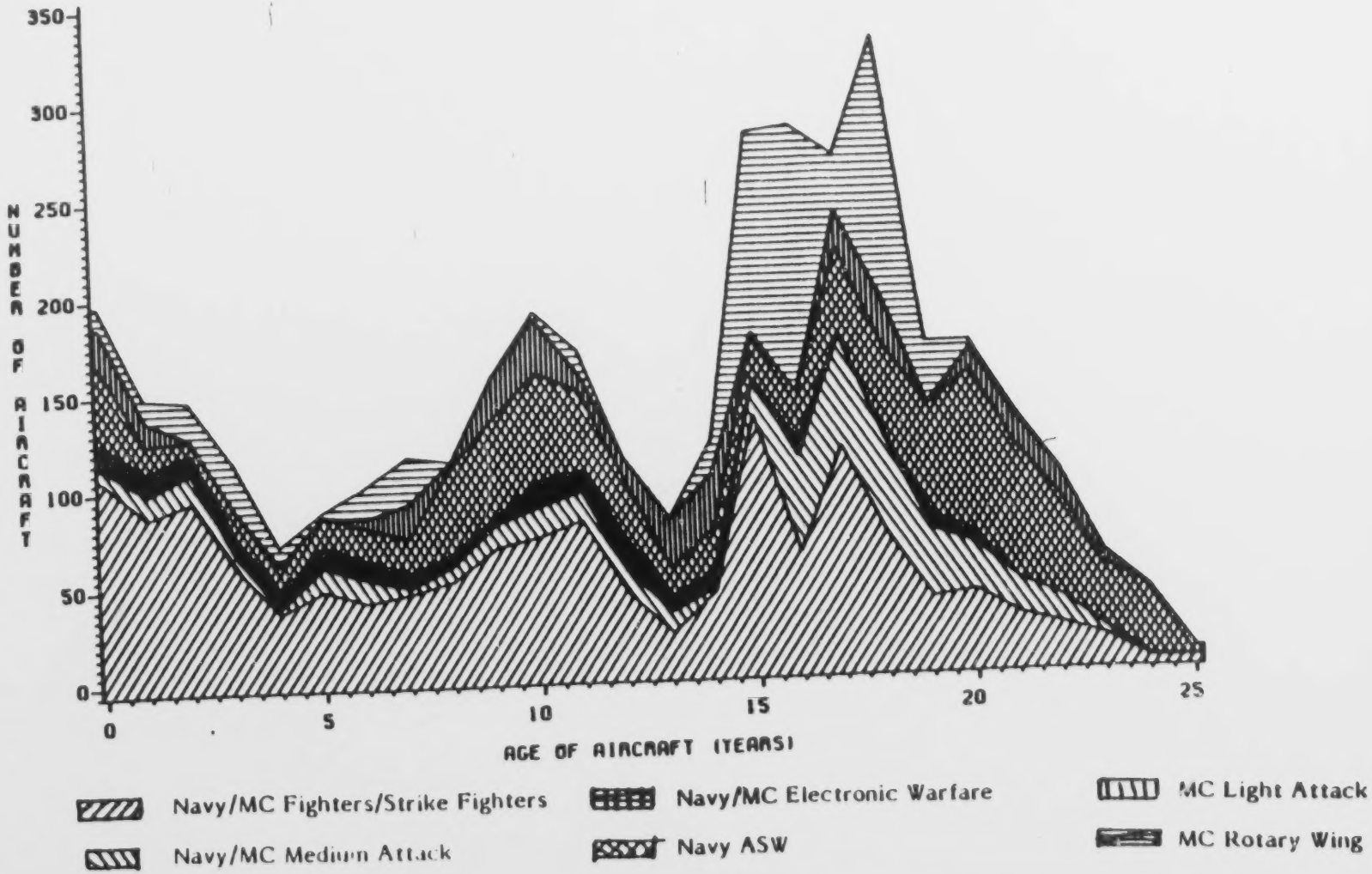
Aging Aircraft

The Navy could solve some of its shortages by keeping older aircraft in the fleet for longer periods. This, however, may be difficult. While CBO is not aware of studies that clearly establish the need to retire aircraft at any particular age, the Navy's judgment is that about 20 years is an appropriate goal. This reflects concern over technological obsolescence in the face of improving Soviet aircraft and physical deterioration, especially for aircraft that make stressful carrier landings. This is a goal which the Navy does not currently expect to meet, however, and its actual retirement assumptions for aircraft range from 14 to 30 years, with an average of 24 (see Table B-6 in Appendix B for details).

For this analysis CBO has used these longer estimates. In the final version of this study, CBO will examine the effects of extending aircraft service lives. But since average service lives are already well beyond the goal of 20 years, it may be difficult to achieve substantial further extensions.

Age at retirement is of particular concern to the Navy because a large fraction of the Navy's inventory will soon be at or beyond 20 years of service life. Today, two-thirds of all the Navy's aircraft are 10 years or older and almost half are at least 15 (see Figure 1). Antisubmarine warfare aircraft and Marine helicopters are particularly old.

FIGURE 1. AGE DISTRIBUTION OF NAVY/MC COMBAT AIRCRAFT--1985



Nor will the Navy's procurement plans reduce fleet age enough to solve this aging problem. Given Navy plans for procurements and retirements, the present average age of almost 13 years will increase to above 13 years and stay there through 1989. It will fall to about 12 years by 1992, after large purchases of aircraft in the late 1980s. But as noted above, the Navy wants to retire aircraft, on average, at 20 years, implying an average fleet age of 10 years if procurement were to be evenly distributed across the age spectrum. Thus, even with large planned procurements, the Navy will not meet its goals. (Figure B-2 in Appendix B projects the ages of the combat fleet by year. Figures B-3 and B-4 show inventories under Navy assumptions and compare inventories and requirements.)

ALTERNATIVE APPROACHES TO MEETING SHORTFALLS

Higher Spending

How can the Navy meet the shortfalls identified in this study? One approach would be to buy more of the aircraft it needs, which would add $10.0 billion to costs over the next five years (see Table 4). This would be in addition to the $71 billion, and over 6 percent average annual real growth, that the Navy plans for its aircraft account during this period. Some of that added $10.0 billion could be offset by slowing production or terminating programs for planes that will be in excess. But the Navy would still have to add about $2.8 billion to the $71 billion it plans to spend. (Estimates of the costs are rough since they assume the real cost per aircraft would not change from 1986 levels.) 6/

Other Approaches

If added spending is not feasible, the Navy could consider other approaches, which will be assessed in more detail in the final version of this study. Returning to the old notional air wing would reduce, but not solve, the shortfall problem. One version of this approach currently being discussed by the Navy would use the F/A-18 to meet any shortfalls of A-6 aircraft until the middle or late 1990s. At that time, the Navy hopes to procure a new generation of attack aircraft called the Advanced Tactical Aircraft. While substituting F/A-18s for A-6s would reduce some of the Navy's near-term shortfalls, it would amount to returning to the old notional air wing at least until the mid-1990s.

The Navy could also attempt to increase efficiency so as to meet a larger part of its shortfalls within planned spending levels. Concern has been expressed that the Navy, among all the services, has by far the largest number of separate aircraft production lines, many of which are operating at very low rates. Selective termination of existing programs, coupled with careful scrutiny of new production programs, might increase the efficiency of Navy aircraft production. Such a change in the way the Navy procures its

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6. In reality, increases in purchases of aircraft could reduce average cost per aircraft while decreases could raise them as overhead and other costs were spread over more or fewer aircraft. These considerations are ignored in these rough estimates, as are any changes in the nature of the aircraft that could, in future years, drive up unit costs. Such factors could alter results substantially.

TABLE 4. COST/SAVINGS OF MEETING SHORTFALLS AND AVOIDING EXCESSES (In billions of 1986 dollars) a/

Aircraft	Quantity	Cost
Cost of Meeting Shortfalls		
A-6	124	4.4
AH-1	24	.2
V-22 b/	12	.3
E-2	16	1.0
EA-6	27	1.1
P-3 c/	1	-
SH-60F d/	64	.8
SH-2	57	.7
S-3	41	1.5
Total	366	10.0
Savings from Avoiding Excesses		
F/A-18	139	4.5
F-14	26	1.2
AV-8B	42	.9
SH-60B	10	.2
CH-53	22	.4
Total	239	7.2
Net Cost		2.8

a. These costs assume that the aircraft would be procured at the 1986 procurement unit cost minus spares. Alternative assumptions could produce substantially different results.

b. As the V-22 (formerly known as the JVX) has not yet entered procurement, CBO used the average procurement unit costs based on the 1985 President's Budget. This includes funding for spares.

c. Costs less than $100 million.

d. The SH-60F (the Navy's carrier based ASW helicopter) will not enter production until 1987. CBO used the Navy's projections for the 1990 procurement unit cost minus spares in order to avoid overestimating its cost.

aircraft would be difficult in the face of the multiple missions that its aircraft inventory must perform.

Finally, the Navy may have to consider lowering its overall requirement for aircraft, perhaps by reducing the number of aircraft in each wing or by cutting back on its plans to have 15 deployable aircraft carriers. Such a step would certainly reduce U.S. naval capabilities. Fiscal constraints may make it unavoidable, particularly if the Navy not only does not get any extra money to meet its aircraft shortfalls but also does not receive all of the $71 billion it currently plans to invest in aircraft over the next five years.

APPENDIXES

APPENDIX A. NAVY/MARINE CORPS COMBAT AIRCRAFT AND THEIR MISSIONS

Table A-1 lists the aircraft that perform the major combat missions and account for the bulk of the financial outlays in the Navy aircraft procurement budget. Nineteen kinds of aircraft are listed, grouped in seven missions. Of these 19 aircraft, 11 were listed for procurement in 1985. Two more are being developed and have not entered procurement yet and six no longer have active production lines.

Fighter/Attack Aircraft. The fighter-attack component of the inventory includes seven kinds of aircraft. (A fighter is an aircraft that usually fights other aircraft, while an attack aircraft typically bombs surface targets.) The Department of the Navy is still procuring four of these: the F-14 Navy fighter interceptor, the F/A-18 fighter attack aircraft, the A-6 medium attack aircraft, and the AV-8 light attack aircraft for the Marine Corps.

The major fighter interceptor mission for the Navy involves protecting the aircraft carrier against attack by enemy fighters and bombers. The F-14, a two-seat, two-engine supersonic aircraft, was designed to rapidly handle attack by multiple aircraft or missiles; it is the only aircraft in the U.S. inventory to carry the long-range Phoenix missile. The F-14 is replacing the F-4 on all of the Navy's large deck carriers. The Navy intends to improve the F-14 over the next few years, giving it a new engine and more advanced avionics.

The F/A-18 Hornet, the newest Navy combat aircraft that began procurement in 1979, is expected to be able to perform both fighter and attack missions by simply changing the munitions it carries. The Navy calls this mission the strike fighter mission. This single-seat, twin-engine, supersonic aircraft will be found on almost all Navy aircraft carriers, primarily as a replacement for the A-7 light attack aircraft, although on two older carriers, the Midway and the Coral Sea, the F/A-18 will replace the F-4 as well. The Navy also intends to provide its two reserve wings with six squadrons of F/A-18s by 1992. In the Marine Corps, the Hornet is to replace the F-4.

The A-6 is the Navy's medium attack aircraft. A twin-engine, two-place, all-weather, subsonic aircraft, it is capable of carrying bombs to targets over 1,000 nautical miles from the carrier. The A-6 was developed in the early 1960s, but the Navy expects to continue its procurement well

TABLE A-1. NAVY/MARINE CORPS COMBAT AIRCRAFT AND THEIR MISSIONS

Mission (Service)	Aircraft		Remarks
	Old	New	
Fighter (Navy)	F-4	F-14	F-14 is to replace F-4 on all large deck carriers
Strike Fighter/ Light Attack (Marine Corps/Navy)	F-4/A-7	F/A-18	F/A-18 is replacing Navy light attack A-7s and Marine Corps F-4 fighters
Medium Attack (Navy, Marine Corps)	A-6/KA-6	—	KA-6 is a tanker version of A-6
Antisubmarine Warfare			
Fixed Wing	P-3	—	Land-based
	S-3	—	Carrier-based
Helo	SH-3	SH-60F	Carrier-based
	SH-2 LAMPS I	—	Based on various surface combatants
	SH-60B LAMPS III	—	
Electronic Warfare	E-2	—	Carrier-based
	EA-6	—	
Marine Light Attack	AV-8A/C	AV-8B	AV-8 can be based on a variety of amphibious ships
	A-4	AV-8B	
Marine Helicopters	AH-1	—	Attack
	CH-46	V-22	Medium assault
	CH-53	—	Heavy assault

into the 1990s. Through its 22 year service life the A-6 has been modified many times. In the next few years the Navy expects to produce a further modification of it. Primary changes will involve increasing its survivability and reliability. In addition to Navy carrier requirements, A-6 procurement supports five squadrons for the Marine Corps.

The AV-8 Harrier is being procured by the Navy as a light attack aircraft for the Marine Corps. The single-seat, single-engine, subsonic plane has the primary feature of being able to land and take off at very short distances, even vertically if necessary. Improved Harriers (AV-8Bs) are currently replacing three squadrons of older AV-8A/Cs and five squadrons of the previous Marine Corps light attack aircraft, the A-4. A-4s will, however, remain in service with the Marine Corps Reserve well into the 1990s.

Antisubmarine Warfare Aircraft (ASW). The Navy maintains an extensive system of air assets intended to detect and destroy enemy submarines. Three aircraft, two of which are helicopters, are being procured for this mission in the 1986 budget. The Navy's defense against enemy submarines forms multiple layers radiating out in range from the aircraft carrier. The longest-range air asset in this defense is the P-3 Orion, which is intended to respond to contacts picked up by sensors on the ocean floor and surface ships. P-3s are stationed at land bases worldwide.

The next layer of air ASW, and the first layer associated with the carrier battle group, is provided by the fixed-wing S-3 aircraft, a four-seat, long-range, all-weather aircraft based on the carrier deck, no longer in production. The LAMPS I and III helicopters which are based on board a variety of surface combatants form the next layer. The distance from the carrier at which the LAMPS helicopters can attack submarines is determined by their range and the distance of the surface combatant from the carrier. Last year the Navy procured both generations of helicopters, the SH-2 (LAMPS I) and the SH-60B (LAMPS III). The last layer of defense for the carrier against enemy submarines is the SH-3 helicopter, also carrier-based. The SH-3 is a relatively old helicopter and the Navy has a development program under way to replace it with the SH-60F. According to Navy plans, the SH-60F will first be procured in 1987, and 91 will be bought during the five-year period 1986-1990.

Electronic Warfare and Early Warning Aircraft. A carrier air wing typically contains a squadron of aircraft intended to accompany attack aircraft on their bombing missions and to suppress enemy radars largely by jamming. This mission is performed by the EA-6, a variant of the A-6. The typical carrier also contains a squadron of aircraft intended to detect incoming enemy aircraft and missiles and to vector fighters to intercept them. This mission is known as early warning and is performed by the E-2.

Marine Helicopters. The Marine Corps maintains an inventory of about 600 helicopters intended to perform a variety of missions. The AH-1 is the Marine Corps attack helicopter, which uses guns, missiles, and rockets to attack enemy troops and tanks. The Marine Corps also has two assault helicopters, the CH-46 and the CH-53, intended to move troops and equipment from amphibious ships to beachheads. The CH-46 is a medium assault helicopter capable of carrying 17 troops or 4,200 pounds of cargo. The CH-53 is a heavy assault helicopter capable of carrying 38 troops or 10,000 pounds of cargo. By the early 1990s, the Marine Corps believes that it will be necessary to replace the CH-46 because of age and obsolescence. The intended replacement is the V-22 Osprey (previously known as the JVX), an aircraft with rotor blades that can be tilted down during forward flight to increase speed. Bell Helicopter Textron Incorporated and the Boeing Military Aircraft Company have formed a team to produce the helicopter, and they project that the Osprey will be able to carry 24 troops or a payload of 5,760 pounds for the Marine assault mission.

APPENDIX B. SUPPLEMENTARY TABLES AND FIGURES

TABLE B-1. NAVY COMBAT AIRCRAFT PROCUREMENT, 1986-1990

Aircraft Type	1986	1987	1988	1989	1990	Total 1986-1990
A-6	6	6	12	12	12	48
EA-6	12	12	9	9	9	51
AV-8	46	47	48	60	35	236
F-14	18	18	12	24	24	96
F/A-18	84	102	120	122	146	574
AH-1	22	0	0	0	0	22
CH-53	14	14	14	14	11	67
SH-60B	18	18	18	18	18	90
SH-60F	0	7	24	30	30	91
P-3	9	9	8	8	8	42
V-22	0	0	0	18	42	60
E-2	6	6	6	6	6	30
SH-2	6	0	0	0	0	6
Total a/	241	239	271	321	341	1,413

SOURCE: Department of the Navy Fiscal Year 1986 Budget Submission.

a. Excludes 3 RP-3D aircraft for which CBO has not modeled requirements.

TABLE B-2. NAVY AND MARINE CORPS AIR WING COMPOSITION

Navy a/		Marine Corps	
Number	Aircraft Type	Number	Aircraft Type
24	F-14	48	F-4 (or F/A-18)
24	F/A-18 (or A-7)	20	A-6
10	A-6	60	A-4 (or AV-8)
4	KA-6	6	RF-4 (or RF/A-18)
4	EA-6	5	EA-6
4	E-2	12	C-130
10	S-3	60	CH-53
6	SH-3	96	CH-46
		24	AH-1
86	Total	24	UH-1
		15	OV-10
		370	Total

SOURCE: Department of Defense Annual Report to Congress for Fiscal Year 1986.

a. The 1986 Annual Report contains the old notional air wing as listed above but indicates that the Navy is changing its wing composition.

TABLE B-3. AIR WING COMPOSITIONS a/

	Old Notional	New Notional	Midway b/	Kennedy c/
F-4/F-14	24	20	0	24
A-7/F/A-18	24	18	48	0
A-6/KA-6	14	20	14	28
S-3	10	10	0	10
SH-3/SH-60F	6	8	6	8
EA-6	4	5	4	5
E-2	4	5	4	5

SOURCE: Department of the Navy

a. Number of aircraft in the Navy's different kinds of air wings.

b. Both the Midway and the Coral Sea have this kind of air wing.

c. Both the Kennedy and the Ranger will have this kind of air wing.

TABLE B-4. AIRCRAFT CARRIERS AND AIR WINGS, 1981 THROUGH 1992

	1981	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992
Number of Carriers												
Total	13	14	14	14	14	14	15	15	15	15	15	16
Deployable	12	13	13	13	13	13	14	14	14	14	14	15
Number of Navy Air Wings												
Active	12	12	12	13	13	13	14	14	14	14	14	14
Reserve	2	2	2	2	2	2	2	2	2	2	2	2
Total	14	14	14	15	15	15	16	16	16	16	16	16
Number of Marine Corps Air Wings												
Active	3	3	3	3	3	3	3	3	3	3	3	3
Reserve	1	1	1	1	1	1	1	1	1	1	1	1
Total	4	4	4	4	4	4	4	4	4	4	4	4

SOURCE: Department of the Navy

TABLE B-5. CARRIER AIR WING (CAW) TRANSITION SCHEDULE, 1985 THROUGH 1992

	1985	1986	1987	1988	1989	1990	1991	1992
Active CAW Total	13	13	14	14	14	14	14	14
Reserve CAW Total	2	2	2	2	2	2	2	2
Active								
Midway	2	2	2	2	2	2	1	1
Kennedy	2	2	2	2	2	2	2	2
Old notional	9	9	8	7	5	4	3	0
New notional	0	0	2	3	5	6	8	11
Reserve								
Standard	2	2	2	2	2	2	2	2

SOURCE: Department of the Navy

TABLE B-6. AIRCRAFT SERVICE LIVES (In years)

Fighter/Attack		Antisubmarine Warfare	
F-14	21	S-3	25
F/A-18	17	P-3	28
F-4	23	SH-3	26
A-7 a/	20	SH-60B	26
A-4	24	SH-60F	26
AV-8A/C	14	SH-2	26
AV-8B	17		
A-6	29		
KA-6	29		
Electronic Warfare		**Marine Helos**	
E-2	20	CH-46	27
EA-6	25	CH-53	30
		AH-1	25

Weighted Average - 24

SOURCE: Department of the Navy

a. The Navy is, however, planning on retiring about 150 A-7s as much as three years earlier than this service life. CBO has reflected the earlier retirement in this analysis.

FIGURE B-1. COMBAT AIRCRAFT REQUIREMENTS

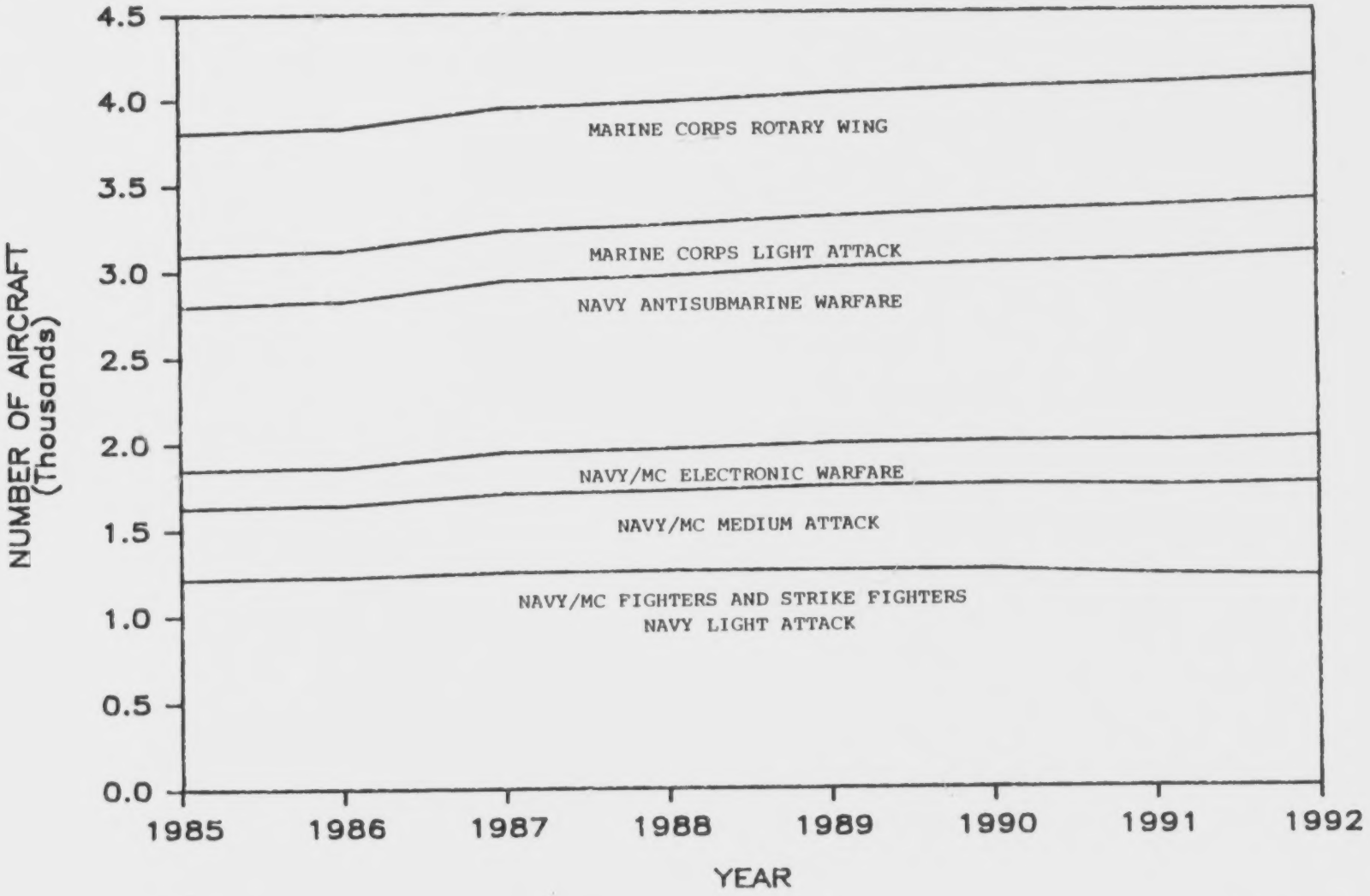

FIGURE B-2. AVERAGE AGE OF COMBAT AIRCRAFT

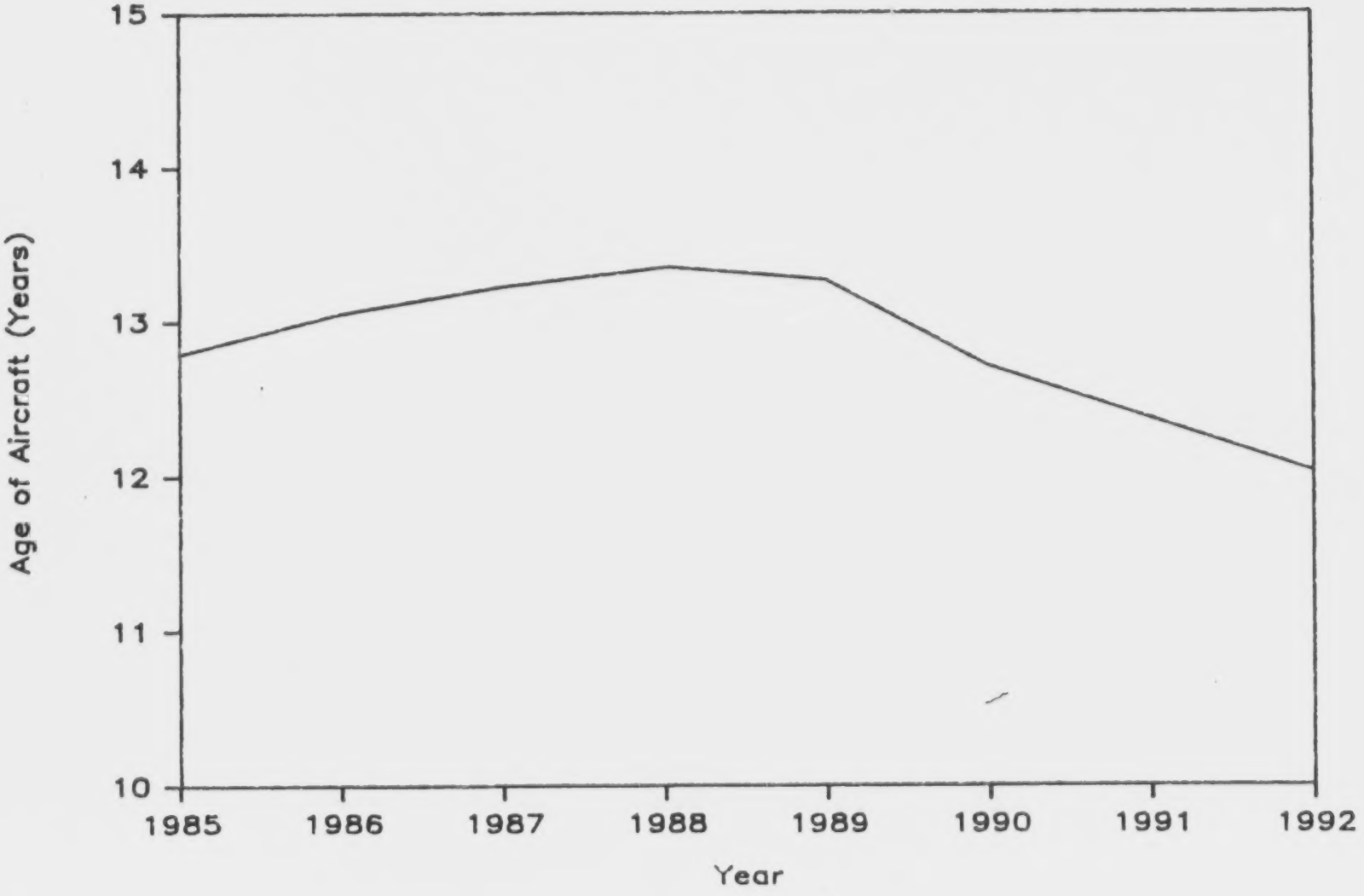

FIGURE B-3. COMBAT AIRCRAFT INVENTORY

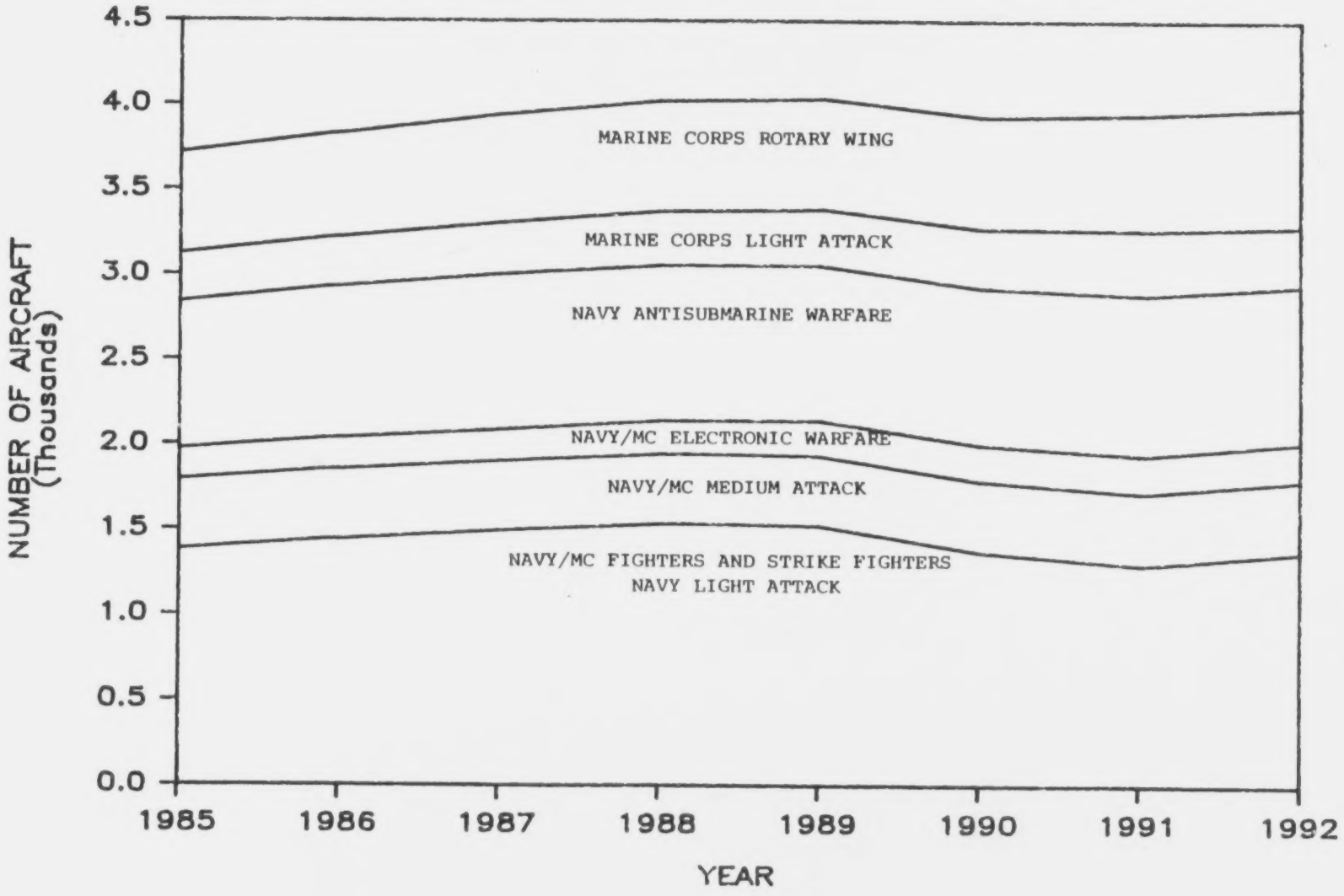

FIGURE B-4. TOTAL COMBAT AIRCRAFT INVENTORY AND REQUIREMENTS, 1985 THROUGH 1992